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ABSTRACT

A study at Barry University (Florida), a private, urban comprehensive university investigated factors in student retention. Demographic data, standardized test scores, and academic performance data were gathered for almost 3,000 students entering the university between fall 1991 and spring 1995. In addition, the students were surveyed on expectations during orientation classes, and again on satisfaction with college experience after 6 weeks of classes. Analysis of the data suggests that while institutional effectiveness as measured by first-semester grade point average (GPA) is an important factor in student retention, perceived institutional effectiveness, interpreted as consumer satisfaction with academic studies, business services, and student life, has only a modest influence on students' academic success and attrition. Even when "customer satisfaction" is given the broadest definition to include satisfaction with friends and off-campus social life, it has barely one-tenth the power of GPA alone to predict student persistence accurately. Therefore, while satisfaction can not assure retention, institutional strategies to improve students' academic performance and speed progress toward a degree may help improve persistence. (Contains 33 references.) (MSE)

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The Impact of Institutional Effectiveness on Student Retention

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This paper was presented at the Thirty-Sixth Annual Forum of the Association for Institutional Research held in Albuquerque, New Mexico, May 5-8, 1996. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum Papers.

Jean Endo
Editor
AIR Forum Publications

ABSTRACT

Institutional effectiveness is a planning and evaluation process for closing the gap between an institution's aspirations and its performance. With increasing scarcity, accreditation demands and noble aspirations for quality are insufficient incentives for institutional effectiveness. But to the extent that effectiveness yields a competitive advantage in student retention, a university has a material incentive for continuous improvement.

Four years of objective and survey data for undergraduates at a private, urban, comprehensive university provide the evidence for this analysis based on logistic regression. Results suggest that institutional effectiveness, measured objectively by first semester GPA, is an important retention factor. However, **perceived** institutional effectiveness, interpreted subjectively as "customer satisfaction" with academic studies, business services, and student life only has a modest influence on students' academic success and attrition. Even when "customer satisfaction" is given the broadest definition to include satisfaction with friends and off–campus social life, it has barely one tenth of the power of GPA alone to accurately predict student persistence.

Institutional effectiveness, understood as satisfaction, cannot turn the attrition tide. However, improved retention is a significant incentive for institutional effectiveness interpreted as institutional strategies to improve students' academic performance and to speed progress toward a degree — even though that effectiveness is largely independent of students' perceived satisfaction.

PURPOSE

This paper shares much with case studies that have searched for predictors correlated with student retention. The new contribution of this research is to assess the influence of institutional effectiveness controlling for other determinants of retention. Institutional effectiveness is a planning and evaluation process for closing the gap between an institution's aspirations, as expressed in its Mission, and its performance. Institutional effectiveness is a measure of the institution's compliance with the educational and social contract it has made with its students as expressed in the mission statement. It has been motivated primarily by the demands of regional accrediting bodies and state legislatures. If institutional effectiveness contributes to an institution's competitive advantage, institutional effectiveness would be easier to sustain as a continuous process, even in this era of increasing resource scarcity.

Student perception of institutional effectiveness has both a direct influence on retention and an indirect effect on retention through first semester GPA. The indirectness of its influence may explain why the "fulfillment of the Mission" is not often cited as a key predictor of retention. Tinto writes,

> In the course of establishing a retention policy, institutions must not only discern the goals and commitments of entering students, they must also ascertain their own goals and commitments. Ultimately the question of institutional choice in the matter of the definition and treatment of student dropout is one concerning the purposes of institutional existence. (Tinto 1987, pp. 134-135)

Tinto (1975) contends that retention is closely tied to integration into the academic and social systems of an institution. Tinto writes, "concern for the education of students and their integration as full members in the social and intellectual life of the institution are the two most important principles of successful retention programs" (Tinto, 1987, p. 187).

REVIEW OF THE LITERATURE

A view pervasive in much of the retention research is that student satisfaction is at the core of student retention. While recognizing diversity in students and institutions, researchers have tried to identify some common retention factors reviewed in this section.

Initial Experience/Orientation Program

The first six weeks at an institution is considered a crucial period in determining retention. The student's integration in the institution's academic and social environment is especially affected by early experiences. The orientation program provided by the institution can be an important factor in the student's early experience (Ramist, 1981, p. 2).

Academic / Social Integration in the Institution

Tinto (1987) theorized that academic and social integration into the life of the institution led to institutional commitment. Integration is a broad term that encompasses many components of the educational experience at an institution. Academic integration, measured by grades and perceptions of learning, involves both formal and informal experiences. Students experience formal integration in classrooms and laboratories. Meanwhile, the informal academic cultures that often develop are equally important in the integration of the student (Tinto, 1987, p. 106). Social integration encompasses the daily life and personal needs of the students. To a large extent, it involves activities that occur outside the classroom. Although academic and social integration refer to different experiences, they are highly interdependent.

Meeting Stated Goals (Institutional Effectiveness)

Institutional awareness of the messages it sends students is important. Students lose confidence in the institution if it is not forthright in publications or if students are treated inequitably. If institutional self-esteem is low, students will develop less institutional commitment. The common theme is that students not satisfied with the institution's accomplishment of its mission were less likely to be retained (Beal and Noel, 1980).

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Faculty-Student Interaction

Interaction among faculty members and students encourages retention. (Ramist 1981 , Wilson, Gaff, Dienst, Wood, and Bavry 1975; Beal and Noel 1980; Levitz and Noel 1986). In his description of persisters at an institution, Noel (1976) found they established a relationship with a faculty member who cared for them as a person and reported satisfaction with an advisor who helped them beyond registration. In 1980, Beal and Noel established that "high-quality advising, counseling, and career planning services are rated as crucial retention factors" (p. 43).

Older Students

Older students enroll for fewer hours and study more (Farabaugh-Dorkins, 1991, p. 1-2). Older students are "more likely to drop out after a semester than younger students" (p. 7).

Transfer Students

About fifteen percent of all four-year college students will transfer at least once within two years. Although the motivation that underlies such behavior may often reflect the student's desire to find a better intstitutional fit, the weight of evidence suggests that it has a negative influence on educational attainment. Pascarella (1991, p.386) suggested that initial community college enrollment hinders educational attainment because attrition after transfer caused by a large drop in grades and difficulty in becoming socially integrated. (Pascarella, 1991, p.373)

Private Church-related

Evidence in this area is not consistent, but it suggests that attending a private university has a net positive influence on educational attainment. At church-related colleges, students of that faith are likely to be strongly committed to persisting at that institution.

College Outcomes

There are some college experiences or accomplishments that enhance educational attainment independently of institution. Significant evidence suggests that persistence is

largely a function of the students' fit with the college environment. The fit is determined by the students' interactions with the academic and social systems. These interactions are categorized as follows: academic achievement, peer relations and extracurricular involvement, interactions with faculty, academic major, residence, orientation and advising, and financial aid and work. (Pascarella, 1991, pp.387-388)

Grades are the best indicator of successful adjustment to a college's intellectual demands. This has been replicated across several national samples. (Pascarella, 1991, p.388) Both frequency and quality of students' interactions with peers and their participation in extracurricular activities are associated with persistence. (Pascarella, 1991, p.391)

An important determinant of a student's level of social integration is residence. Resident students have significantly more social interactions with peers and faculty members and are more likely to be involved in extracurricular activities. Commuter students frequently work which limits the opportunity for extracurricular involvement and social integration.

Metzner and Bean (1987) studied commuter students of all ages. They found four variables related to retention: college GPA, study habits, hours enrolled, and intent to leave. Farabaugh-Dorkins (1991), testing a prior Bean and Metzner (1985) model, found older students, lower college GPA, and prior intent to leave college are predictors of attrition.

Financial Difficulty

Surprisingly, the literature does not support financial difficulty as a factor that contributes to attrition: "Financial difficulty is the second most frequently cited reason for dropping out, but, after controlling for academic ability and motivation, there is almost no relationship between income and attrition" (Ramist, 1981, p. 2). Noel (1976), in describing the characteristics of persisters, found that there is not much difference in financial difficulties between persisters and leavers. Further, he found only a slight relationship between scholarship aid and retention. Financial difficulty may be just one among many interdependent factors motivating the student, but it is seen by students as an "externally

acceptable" reason to drop out of school.

Results of the research on the impact of financial aid on persistence is mixed. Murdock (1987) conducted a meta-analysis of forty-six studies that estimated the effect of general financial aid on persistence. Across all studies the effect was small but statistically significant. The findings regarding the relative influence of various forms of financial aid are also mixed. Overall, the evidence suggests that students who receive financial aid are just as likely to persist in college as those who do not, and scholarships have the strongest positive influence on persistence. (Pascarella, 1991, p.406)

The influence of employment on persistence and educational attainment depends on where the employment occurs. Evidence shows that off-campus employment has a negative influence while on-campus employment has a positive influence on persistence. Financial aid had a greater effect on persistence in later years than freshman year, in private versus public institutions, and in studies after 1975 than in earlier ones. (Hossler, 1991, p.51)

Defining a Dropout

Some students entering college may not desire to complete a degree program. Since they met their goals, to identify their attrition as failure is inaccurate. Defining a dropout is complex. From the institutional perspective all who withdraw are classified as dropouts. Each withdrawal creates a vacancy that might have been filled by a persisting student.

An institution must choose not only a retention strategy but also which leaving behavior to treat. For students who do not fit the college's mission, it may not be in the interest of either the college or the student to encourage persistence. For the student who has academic difficulty but has goals compatible with the institution's, intervention may be fruitful. All forms of leaving are labeled dropout, but they are not equally deserving of policy action.

THEORETICAL FRAMEWORK

The theoretical framework described by the flow chart in Figure 1 is largely inspired by

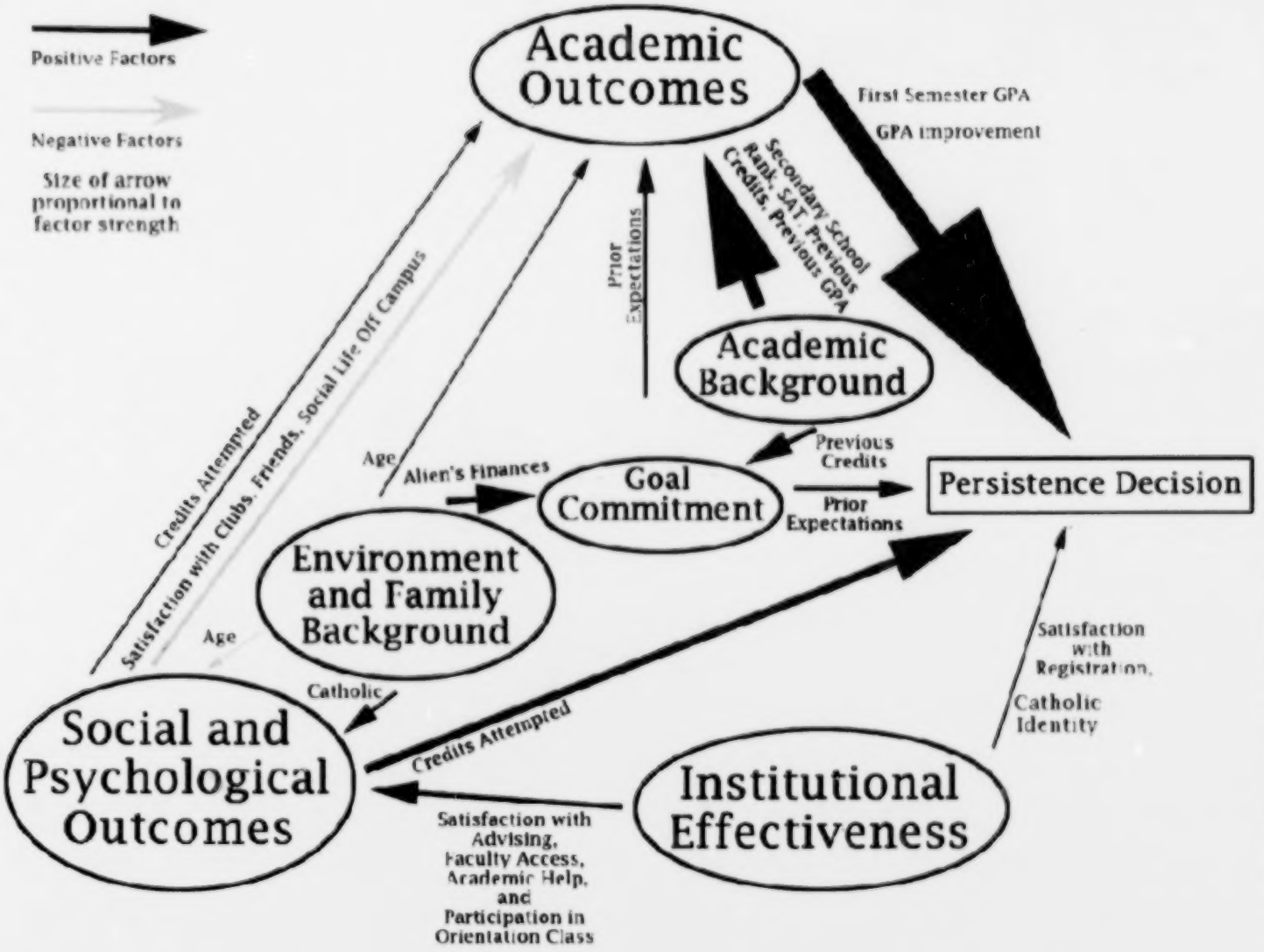

FIG. 1. Theoretical Model of First-Year Student Persistence

Tinto and motivated the choice of predictors investigated in this study. The persistence decision is determined by four conceptual variables: (1) academic outcomes, (2) social / psychological outcomes, (3) institutional effectiveness, and (4)goal commitment determined by background variables external to the institution and preceding the student's initial enrollment. Academic outcomes are a product of three forces: (1) the student's academic preparation and motivation, (2) the student's personal goals and expectations of the institution, and (3) competing and complementary social outcomes. Social / psychological outcomes are a product of the student's background and institutional effectiveness.

METHODOLOGY

Introduction to Logit Regression

Ordinary least squares (OLS) regression is not appropriate for analyzing the determinants of a dichotomous dependent variable (Y) like retention. Two problems stand out. First, the required assumption that the error terms have constant variance is untenable. If the expected value of Y is close to 1, then all error terms will all be large (if observed Y=0) or small (if Y=1) while all error terms will be approximately 0.5 if the expected value of Y is close to 0.5. Consequently, while the estimated OLS coefficients would be unbiased, the standard errors would be incorrectly estimated. Second, for extreme values of the predictors (X), a linear model will predict impossible probabilities of retention, i.e., $p > 1$ or $p < 0$.

Logit regression[1] overcomes these problems by transforming Y into an S–shaped function approaching 0 and 1 asymptotically. Let P be the probability of persistence. The odds favoring retention are: P / (1-P), and the logit is the natural log of the odds: $L = \log_e\{P / (1-P)\}$. Logit regression refers to models with a logit as the dependent variable:

$$L_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \ldots + \beta_{K-1} X_{i,K-1}$$

Since the logit function is flattest near the extremes, it reflects the intuitive notion that marginal changes in predictors will have the least influence when the probability of

persistence is near 0 or 1.

The coefficient, β_j, estimates the increase in the logit for a unit increase in X_j. However, since the probability of retention is a nonlinear function of the X's, it is difficult to interpret the coefficients in terms of the probability of retention. One interpretation of β_j is that each unit increase in X_j multiplies the odds favoring retention by e^{β_j}, which is called the **odds ratio** and is often used comparatively to describe the strength of an effect. The stronger the relation between X and retention, the farther the odds ratio will be from 1.

Alternatively, we can describe the effect of X in terms of probabilities. The effect of a unit change in X_j on the predicted probability of retention, assuming other X's are at their mean values, is reported in this paper as the delta–p statistic (see Peterson, 1984).

Goodness-of-fit measures are harder to interpret than with OLS regression. **McFadden's Rho-squared** is intended to mimic an OLS R-squared. However, it is lower than R-squared with values of 0.2 to 0.4 considered very satisfactory.

The success of the model in classifying students can be judged by the proportion of the sample for which the retention decision is correctly predicted. The **success index** is the gain the model shows over a purely random model which assigns the same probability of retention (the sample mean) to every student in the sample.

Data Sources

Data were gathered for nearly 3,000 undergraduates who first entered the university between the fall 1991 term and the spring 1995 term. The sample includes full–time (83% of sample) and part–time students, transfer(60%) and first–time in college students, commuter (70%) and residential students. The average age was 24 and the sample contained 67% in–state residents, 65% women, 53% minority students and 28% resident aliens or international students. Seventy one percent of the students received financial aid from some source. Students were defined as persisters if they either graduated or were enrolled three semesters after the first enrollment.

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Variables used to predict persistence came from three sources and are defined in Table 1.

TABLE 1. Definition of Variables

Variable	Definition
ACADhlp	Five point scale indicating the extent to which "opportunities outside of class to receive help with academic problems" meets expectations
ACCESS	Five point scale indicating the extent to which the student agrees "faculty are accessible to students, not only through office hours, but elsewhere on campus"
ADVISING	Five point scale indicating the extent to which "the quality of advice and information I received about course selection and course requirements" meets expectations
AGE	Student's age at matriculation
ALIEN	1 if resident alien, 0 if not
ANGLO	1 if white non-Hispanic, 0 if not
ATTEMPT	Number of credits attempted in first semester
BLACK	1 if Black or Black Hispanic, 0 if not
CATHOLIC	1 if self-identified Catholic, 0 if not
CLUBS	Five point scale indicating the extent to which "opportunities to participate in clubs and organizations on campus" meets expectations
EXPECT	Five point scale indicating the extent to which the student agrees "I expect to receive my degree from Barry University"
FINCDIF	Five point scale indicating the extent to which the student agrees "I am concerned that financial difficulties may affect my ability to stay at Barry"
FRNDS	Five point scale indicating the extent to which the student agrees "I am finding some of my best friends here at Barry"
FULLTIME	1 if student enrolled for 12 or more credits in first semester, 0 if not
GPA1	Student's GPA after first semester
GPA21	Student's cum GPA after second semester minus student's GPA after first semester
NOprevCRD	1 if student has no transfer credits from any source, 0 if not
ORI100	1 if student enrolled in Orientation Course, 0 if not
prevCRD	1 if no transfer credits, 2 if 60 or fewer transfer credits, 3 if more than 60 transfer credits
prevGPA	Student's GPA from high school or previous college(s)
REGISTRA	Five point scale indicating the extent to which "the registration process" meets expectations
SAT	Student's SAT score
SOCoff	Five point scale indicating the extent to which "social opportunities off campus" meets expectations
ssRANK	Student's rank in secondary school
TRANSFER	1 if 15 or more transfer credits or grades reported from previous college, 0 if not
US	1 if United States citizen, 0 if not

The students' admissions records yielded demographic information, standardized test scores, and data on academic performance at previous institutions. The students' academic record at Barry yielded academic performance data. The final source was student surveys. Two surveys were given. During orientation, before classes begin, students were given the Cooperative Institutional Research Program survey[2] which yielded data on prior expectations of graduation with an average response rate of 36%. After six weeks of classes, students were given a locally developed survey which asked about satisfaction with experiences at Barry. The response rate averaged 39%. Since some questions were not asked every year, the sample size varies from 425 to 1030 for different questions as shown by the descriptive statistics in Table 2.

TABLE 2. Descriptive Statistics for Variables

Variable	Sample Size	Mean	Standard Deviation
ACADhlp	1001	2.297	0.921
ACCESS	923	2.275	0.997
ADVISING	1028	2.622	1.034
AGE	3494	23.774	7.259
ATTEMPT	3513	13.425	3.805
CLUBS	975	2.625	0.866
EXPECT	1029	1.895	1.079
FINCDIF	841	2.710	1.323
FRNDS	425	2.214	1.032
GPA1	3330	2.840	0.920
GPA21	2481	-0.029	0.372
prevCRD	3285	32.555	30.083
prevGPA	2741	2.830	0.585
REGISTRA	1030	3.081	1.061
SAT	2405	868.598	156.915
SOCoff	956	2.748	0.993
ssRANK	880	0.351	0.256

Measures of Institutional Effectiveness and Other Conceptual Variables

Table 3 identifies the variables used to estimate the influence of the conceptual variables portrayed in Figure 1. Measures of institutional effectiveness came primarily from students' perceptions of academic studies, business services, and student life. Students reported on everything from the quality of teaching to the food service, but only measures significantly related to persistence or grades were retained. Student participation in the university's orientation course was also taken as a measure of institutional effectiveness since it was an effort to facilitate the students' effective integration into the university. Finally, because Barry's mission defines it as a Catholic institution, the higher retention of Catholic students is interpreted as evidence of institutional effectiveness in meeting this mission.

TABLE 3. Components of Theoretical/Conceptual Persistence Factors

Persistence Factor	Component Variables
Academic Outcomes	AGE, ATTEMPT, FULLTIME, GPA1, GPA21, NOprevCRD, ORI100
Social & Psychological Outcomes	AGE, ATTEMPT, CATHOLIC, CLUBS, FRNDS, ORI100, SOCoff
Academic Background	NoprevCRD, prevCRD, prevGPA, SAT, ssRANK, TRANSFER
Goal Commitment	EXPECT, FINCDIF, NoprevCRD, prevCRD
Customer Satisfaction	ACADhlp, ACCESS, ADVISING, CLUBS, FRNDS, REGISTRA, SOCoff
Institutional Effectiveness	ACADhlp, ACCESS, ADVISING, CATHOLIC, ORI100, REGISTRA
Family Background	AGE, ALIEN, ANGLO, BLACK, US CATHOLIC, FINCDIF,

Academic outcomes are measured by academic success, previous experience, and participation in the orientation course. Social and psychological outcomes are measured by

satisfaction with social experiences and on–campus social involvement. Goal commitment is measured by prior expectations of graduation, previous college–level experience, and the student's perception of the impact of financial difficulties on persistence.

Model Specification

Missing observations were a problem in model specification. Some variables, especially survey results, were available for only part of the sample. In order to get the best[3] coefficient estimates, the first round of estimation included only variables available for the full sample. A second round of estimation included an artificial variable constructed as a linear combination of first round variables, using their estimated coefficients. This artificial variable partially "protected" the explanatory power of first round variables, but at the cost of not allowing second round variables to fully "compete" with earlier variables for explanatory power.

For two variables, missing values were replaced by values estimated from a linear regression on those variables. GPA21 shows academic achievement "momentum" into the second semester and was estimated for 71 students (2.5% of sample) who left after only one semester. EXPECT, **prior** expectation of graduation, was estimated for 1813 students (64% of sample!) because this theoretically important variable precedes, in time, factors reflecting the students' experience in this institution. The omission of EXPECT in the first round would bias the estimated coefficients for the variables included in that round. A concern about using estimated values for such a large proportion of the sample is the self–selection bias of students who reported prior expectations compared to those who did not. One indication of possible bias is the attrition rate was 6% higher for the latter group.

RESULTS

Table 4 shows the logit regression results used to estimate variables' direct influence on persistence. Measuring goodness–of–fit, this logit regression classified 78% of the students correctly (by persistence / attrition status). In contrast, a purely random model, assigning

average probability of retention to each student, that would have classified 65% of the students correctly. The odd's ratio shows that first semester GPA is the dominating determinant of persistence, as the literature suggests. Also consistent with the literature is the positive influence of credit hours enrolled and prior expectations—as well as the negative impact of age. Both financial aid awarded and family income were statistically insignificant for freshmen and transfer students. However, financial concerns reduce the odds of retention for resident aliens (mostly Cuban and Haitian in this sample). Since aliens receive financial aid in nearly the same proportion as U.S. citizens (72% vs 75%) and on average receive larger awards after controlling for income, the influence of financial concerns may be more a cultural phenomenon than objectively financial.

TABLE 4. Logit Regression Results for First-Year Retention

Independent Variable	Coefficient	Odd's Ratio
First round of variable entry N=2838, -2 LOG L = -1303, McFadden R^2 = 0.20		
Square root of GPA1	3.0046***	16.35'
GPA21	1.3924***	1.65'
ATTEMPT	0.1207***	1.44
NOprevCRD	-0.6327***	0.53
CATHOLIC	0.3958**	1.49
BLACK	0.3899**	1.48
EXPECT	0.4442***	1.39'
ORI100	0.5306***	1.70
AGE	-0.0230**	0.89
Second round of variable entry N=829, -2 LOG L = -358, McFadden R^2 = 0.20		
REGISTRA	0.1975*	1.23'
FINCDIF*ALIEN	0.2564*	1.41'

' odd's ratio adjusted for unit change of one standard deviation *p≤.05; **p≤.01; ***p≤.001 one-tail test

Three institutional effectiveness factors were significant. Catholic students had 50% greater odds of persistence suggesting that Barry's Catholic mission was resonating effectively with students who share that faith. The college sponsored orientation course was even more effective in raising the odds of persistence. Finally, perceived effectiveness in the registration process, REGISTRA, had a positive influence on persistence. Surprisingly, student satisfaction with teaching quality, course size, variety of courses available, class placement, leadership opportunities, food service, and other areas of "institutional effectiveness" had no statistically significant influence on persistence or grades.

Several factors strongly supported in the literature were not significant in this analysis. Dorm residence, on–campus employment, and the student's perception that Barry is a place where she can develop exciting career interests did not have the expected positive influence on retention, nor did the number of hours working off campus have the expected negative impact. Satisfaction with advising and access to faculty suggest strong relationships with faculty members and are expected to predict persistence. While both were predictors of GPA (see Table 5), neither had direct impact on persistence. After controlling for the variables in Table 4, there were no significant persistence differences among majors.

Indirect impacts on persistence were estimated using coefficients from ordinary least squares regression on GPA. The relative size of these impacts can be judged from the indirect impacts on the probability of retention thru GPA shown in Table 5 (3rd data column).

For transfer students, the GPA differential between Blacks and other ethnic groups (rows 9-10) is disturbing and unexplained by this analysis. A speculation is that this effect reflects the "quality" of the schools from which Blacks transfer. For minority students only, satisfaction with opportunities to receive academic help outside of class (row 17) has a modest influence on grades. For U.S. citizens only, perceptions of the accessibility of faculty members outside of class and office hours (row 21) have an impact on grades. This suggests

TABLE 5. Factors Impacting First Year Retention

Row	Retention Factor	Contribution to Model's Predictive Success	Impact on Probability of Retention: Direct Impact	Thru 1st Semester GPA	Total Impact	Unit of Change
1	Higher first semester GPA	53.9%	0.41***		0.41	.92†
2	GPA improves 1st to 2nd semester	13.6%	0.07***		0.07	0.35†
3	More credits attempted in 1st semester	9.9%	0.05***	0.04***	0.09	3 credits
4	Prior expectation of graduation	7.3%	0.05***	0.06***	0.11	0.74†$
5	Aliens with less financial concerns	5.7%	0.05*		0.05	1.34†$
6	No previous college credits	4.0%	-0.09***	-0.08***	-0.18	
7	Higher GPA, previous institution(s)	3.8%		0.11***	0.11	0.58†
8	Participant in orientation course	2.5%	0.08***		0.08	
9	non-Black transfer students	1.8%	-0.06**	0.10**	0.04	
10	Black transfer students	1.6%	0.06**	-0.10**	-0.04	
11	Satisfaction with registration process	1.6%	0.03*		0.03	1.06†$
12	Age	1.5%	-0.02**	0.04***	0.02	5 years
13	Black freshmen	1.4%	0.06**		0.06	
14	Catholic students	1.3%	0.06**		0.06	
15	Satisfaction with opportunities to participate in clubs & organizations	0.6%		-0.04***	-0.04	0.87†$
16	Higher SAT	0.6%		0.07***	0.07	157†
17	Minority students satisfaction with opportunities for academic help	0.5%		0.03**	0.03	0.92†$
18	Agrees with "finding some best friends at Barry"	0.4%		-0.04**	-0.04	1.03†$
19	Satisfaction with academic advising	0.3%		0.03*	0.03	1.03†$
20	Satisfaction with social opportunities off campus	0.2%		-0.03*	-0.03	0.99†$
21	US citizen's experience that faculty are accessible on campus	0.2%		0.02**	0.02	1.00†$
22	Secondary school class rank	0.2%		0.01*	0.01	1 decile

† represents one standard deviation

$ survey response on a 5 point scale

*p≤.05; **p≤.01; ***p≤.001 one–tail test

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that the mentor relationship with faculty members is an expectation primarily of American citizens. Since the distribution of responses was similar for citizens and non–citizens, citizens are not **more** satisfied with faculty mentoring—they are just **more affected**.

Table 5 provides the best summary of the predicted, total impact of each variable on retention. The first data column shows how much of the model's explanatory power is attributable to each variable. For instance, more than half the model's ability to improve classification of students' persistence/attrition status (relative to a random model) comes from the contribution of GPA1.

The next three columns estimate the direct, indirect, and total impacts of a unit change in the predictor on the probability of retention, i.e. the delta–p statistic. Since predictors are not measured in comparable units, these estimated impacts cannot be directly compared without adjusting the size of a "unit of change." For dichotomous variables the unit is yes/no. For other variables the last column defines units so as to make impacts roughly comparable by using one standard deviation as the unit. Generally a variable's influence on the probability of retention and its contribution to explanatory power give a similar impression of the factor's "strength." Exceptions occur. For instance, because resident aliens' financial concerns have a relatively high variance, the variable makes a larger contribution to explanatory power compared to its impact on probability of retention.

Sometimes a variable's direct influence on retention is reinforced by its positive impact on GPA, but in other cases the relationship is dialectical. The negative direct impact of AGE on retention may reflect conflicting demands from older students' complex lives, but is more than balanced by the positive influence on GPA, reflecting their maturity. Although Black students are more likely to persist, other factors equal, this assumption is not viable for Black transfer students whose GPA is 0.3 lower after controlls. Illustrating reinforcing impacts, more credit hours improves both GPA and persistence as it increases integration and identification with the college. A lack of prior college–level academic experience has a

negative effect on both persistence and GPA because the student lacks experiences that would facilitate both academic and social integration.

Table 6 reinforces that a student's academic success is the dominating retention factor. Institutional effectiveness as measured in this study only has a modest influence on persistence, accounting for just 6% of the model's predictive success. The component of institutional effectiveness measured by student satisfaction is especially small. We must shift our institutional effectiveness strategizing and assessment focus to objective measures[4] of student learning and progress towards a degree and away from subjective measures of student perception, like surveys. Although students may report high levels of satisfaction with teaching and courses during the semester, their teachers' perceptions expressed in grades at the end of the semester can dominate their own perceptions of how well they are doing. Academic institutional effectiveness needs to focus on strategies that improve grades rather than strategies that focus on satisfaction. For instance, if smaller classes raise satisfaction, but do not improve grades, then smaller classes are not increasing effectiveness in ways that affect student persistence.

TABLE 6. Contribution of Conceptual Variables to Prediction

Variable	Contribution to Model's Predictive Success
Academic Outcomes	81%
Social & Psychological Outcomes	24%
Academic Background	12%
Goal Commitment	10%
Institutional Effectiveness	6%
Customer Satisfaction	6%
Family Background	4%

CONCLUSIONS AND IMPLICATIONS

While these data show that social and psychological outcomes make an important contribution to predicting retention, Table 6 shows that some social outcomes (CLUBS, FRNDS, and SOCoff) contribute to attrition rather than persistence because they have a negative influence on grades. Eaton and Bean (1995) have noted that there is a danger that students will use social success as a substitute for academic success or as an avenue to avoid the demands of academic integration.

Further questions are raised by the insignificance of some other measures of social integration. For our diverse campus, the student's perception that she sometimes feels disconnected because many other students were very different from her had no impact on persistence. Neither did the perception that the environment was caring nor satisfaction with on-campus social life—both of which should have been correlated with social integration. For a commuter campus with many non-traditional students, the importance of social integration as a determinant of persistence must be seriously re-evaluated, especially in light of the potential hazard it creates for academic achievement. In this analysis, except for a shared Catholic identity, the only variables associated with social integration that **encouraged** persistence were those that also supported academic involvement: credit hours attempted, prior expectation of graduation, and participation in the orientation course.

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Endnotes

1. The Systat Logit module was used for this analysis.

2. Developed by the Higher Education Research Institute

3. Larger sample size reduces the variance of the estimated coefficients. The parameter estimates in this study were further improved by deleting 12 "high influence" observations out of a sample of 2850.

4. Standardized tests may not be the best objective measures of learning for this purpose.